DOOSAN Document Transmittal Upper Trishuli-1 HEP (216MW)		Date 2022-08-09	DT No.: UT1-HEP-DHI-PC-D-0054	SHEET 1 OF 1
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SUBJECT	Review Note RN-0208_ToR for NA for Sediment Deposition and Flushing of the DB			

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1	RN-0208	AN	UT1-C-030-CVL-DC-52002	1	ToR for NA for Sediment Deposition and Flushing of the DB	
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Legend of Review Status
A : APPROVED
AN : APPROVED AS NOTED
RR : RETURN FOR RESUBMISSION
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UPPER TRISHULI-1 HEP (216MW)			
Client	**Nepal Water and Energy Development Company Private Limited**		
Owner's Engineer	**Tractebel Engineering GmbH / Jade Consult**		
REVIEW NOTE			
Contractor	**Doosan Enerbility**		
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A: Approved AN: Approved as Noted RR: Returned for Resubmission FI: For Information, only			

Comments:

- Section 1.2, Layout and Operating Mode of the Desander Basin: Reference should be made to the drawings of desander basins presented in section 7 Appendices.
- Section 2.2, Sediments:
  - It is not the average annual load which has to be simulated. Concentrations of suspended sediments to be tested should be defined for the numerical simulations. Either by ppm or derived from typical flood discharges during the monsoon.
  - Is there a definition at which Q, or at which sediment concentration (ppm) the power plant must shut down? In the 2013/2014 model test report is a statement that power plant to be shut down at the 10-yr flood event (Q = 1,602 m^3/s). What is the applicable situation for the revised design? The relevant sediment concentrations for the modelling are from 500 ppm at design flow to 5,445 ppm at 10-yr flood, with the focus on tests with concentrations **above** 1,800 ppm at average monsoon flood
- Section 5.1, Numerical Simulation Requirements:
  - The approach flow is decisive for the flow pattern in the desander basin. Therefore, hydraulic situation in the three basins will be different for different discharges (e.g. operation of 3, 2 or 1 turbine), and for flushing scenarios (different hydraulics for flushing basin in the centre, left, or right).
  - Therefore, either a complex model with all three basins should be modelled, or the hydraulic boundary conditions at the start of the desander basin have to be inserted into a single desander basin model as result of an independent different hydraulic model to simulate the approach flow in the bend and the straight appproach sections (sediment concentrations might be influenced by the secondary current due to the bend in the approach tunnel).
  - Hydraulics and distribution between the three basins will be different for flows below design discharge. Also during flushing the hydraulics for the remainder will be different.
  - Scenarios of different sediment concentrations to be defined. These must reflect the higher and peak concentrations during floods (average sediment concentration is not representative, nor is sediment concentration during low flow season; these are not

relevant for the abrasion damage of the turbines). See above suggestions based on model test report of Hydro Lab from 2013/2014.

- Section 5.2, Calculation Contents,:
  - (3): definition of “working section length” to be clearly indicated in supporting drawing.
  - (4): who is ‘the client’ in this case?
  - (5): … for agiven set of defined load cases.
  - (6): “… *when the sedimentation efficiency at the end of desander basin reaches the design criteria.*” How is this being defined in the prototype?

Disclaimer:

Any approval will not release the Contractor from any of his obligations under the Contract. Despite the Engineer's approval the Contractor remains fully responsible for design, calculation, dimensioning, supply and installation without limitations.

Dr. Frank Negrassus, hydraulic specialist